

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

### Improvements in Brakes

We, SMALL & PARKES LTD., a British Company, of Hendham Vale Works, Manchester, 9, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to brakes and more particularly to improvements in the friction surfaces thereof.

It is desirable that the friction surfaces of brakes should have satisfactory characteristics both at temperatures to which they are subjected during normal usage and also at higher temperatures to which they may be subjected occasionally owing to severe conditions, but it has been found to be difficult to obtain a friction material which has the characteristic of a low rate of wear at or below the temperature of normal usage and also the characteristic of a low rate of wear and small degree of fade at higher temperatures.

Friction materials having one or other of the aforesaid characteristics are well known but a pre-mixed material containing both types does not have the two characteristics required.

We have found, however, and this forms the basis of the present invention, that a friction surface pad or element comprised of zones of two types of friction materials, one type having the characteristic of low rate of wear at the temperature of normal usage and the other type having the characteristic of low rate of wear and small degree of fade at high temperatures, will give satisfactory results provided that in operation of the brake the zone or zones of

one type of material is/are so arranged as not to contact the same part or parts of the mating surface of the brake as does/do the zone or zones of the other type of material.

Although it is to be understood that the invention is not limited to the friction pads of disc brakes it is particularly applicable thereto and it will now be described with reference to the accompanying drawings which show a disc brake having the friction pads secured on caliper arms arranged one at each side of the discs. In these drawings:—

The invention will be more fully described with reference to the accompanying drawings which show a pad for a disc brake. In these drawings:—

Fig. 1 is a perspective view of the disc brake.

Fig. 2 is an end view showing the disc and caliper arms with the friction pads secured therein.

Fig. 3 is a view looking in the direction of the arrow 3 Fig. 2.

Fig. 4 is a view of a modified form of brake pad, and

Fig. 5 is a section on line 5-5 of Fig. 4.

In pads for disc brakes it is found to be advantageous to have the zone of a friction material having the characteristics of low rate of wear and small degree of fading at high temperature between two zones of a friction material having a low rate of wear at the temperature of normal usage and a pad of such construction is shown in the drawings.

In these drawings A represents the disc, B the caliper arms and C the friction pads carried thereby one on either side of the disc.

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Each pad C is formed in three separate zones of friction material, the middle zone c being of a friction material which is resistant to wear and a small degree of fading at temperatures above the temperature of normal usage and each of the outer zones c' being of a friction material which has a low rate of wear at the normal temperature of usage.

10 In order to form a composite pad in the form of a single unit which can be easily affixed to its supporting plate in the caliper arm the material of each zone c' c c' may be pre-formed and pieces of the pre-formed materials placed in a mould and moulded into one composite pad as shown in Figs. 2 and 3 without any spaces or gaps between the joints.

15 Alternatively, as shown in Figs. 4 and 5 each piece of pre-formed material c' c c' may be separately mounted on the plate b of the caliper arm with a space d between them such spaces forming grooves or channels which will prevent the flow of material from one zone to another should the friction surface of a zone suffer decomposition from any cause.

20 In the arrangements in Figs. 2 and 3 and in Figs. 4 and 5 the inner and outer edges of each piece c', c and c' are curved, the curvature conforms to a circle struck from the centre of the plate A with which pad co-operates so that each piece will mate with a different zone of the plate.

25 The invention is applicable to pads constructed of organic or non-organic friction materials or to those in which the friction material having one of the desired characteristics is organic and the other inorganic.

30 An example of a friction material having a low rate of wear at temperatures at or below the temperatures of normal usage is as follows:—

	Asbestos Fibre.	45-50 parts by weight
45	Barytes.	15-20 " " "
	CNSL Friction Dust.	15-20 " " "
	Copper Powder.	5-10 " " "
	Carbon Black.	0.5-2.0 " " "
50	CNSL modified phenolic binder resin.	15-20 " " "

The expression CNSL used in the above example means Cashew Nut shell liquid polymer hardened by reaction with an aldehyde donor.

55 The ingredients are well fixed together, pre-formed to the desired shape, cured by heat and pressure in a mould and finally baked in an oven for several hours.

60 An example of a friction material having a low rate of wear and a small degree of fading at temperatures higher than the normal temperatures of usage is as follows:—

	Asbestos fibre.	48-50 parts by weight
	Barytes.	15-20 " " "
	Green Chromium oxide.	0-5 " " "
	Ferric oxide.	0-5 " " "
	Copper powder.	10-15 " " "
	Carbon black.	0.5-2.0 " " "
	Phenolic binder resin	10-15 " " "

75 The ingredients are well mixed together, pre-formed to the desired shape, cured by heat and pressure in a mould and finally baked in an oven for several hours.

80 As already stated the invention is not limited to disc brakes in which the friction member is formed of a number of pads but is also applicable to brakes in which the friction member is a complete disc and also to the brake shoes of drum brakes.

#### WHAT WE CLAIM IS:—

85 1. A friction pad or element for a brake comprised of zones of two types of friction material one type having the characteristic of low rate of wear at the temperature of normal usage and the other type having the characteristic of low rate of wear and small degree of fade at temperatures higher than said temperature of normal usage, the zone or zones of one type of material being so arranged as not to contact the same part or parts of the mating surface of the brake as does/do the zone or zones of the other type of material.

100 2. A friction pad for a disc brake divided into three zones, a central zone formed of a friction material having a low rate of wear and a small degree of fade at temperatures higher than the temperature of normal usage and two outer zones of friction material having a low rate of wear at the temperature of normal usage, the central zone being so arranged as not to contact the same part of the mating surface of the brake as do the outer zones.

110 3. A friction pad for a disc brake as in Claim 2 in which the friction material forming each of the zones is separately pre-formed and the three components then moulded together to form a composite unit.

115 4. A friction pad for a disc brake as in Claim 2 in which the friction material forming each of the zones is separately pre-formed and the pre-formed parts mounted in the brake assembly with a space between them thereby forming grooves or channels which will prevent the flow of material from one groove to another should the friction surface of a zone suffer decomposition from any cause.

125 5. A friction pad or element for a brake substantially as hereinbefore described and illustrated in the accompanying drawings.

6. A disc brake having the friction pads co-operating with the disc formed substan-

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tially as hereinbefore described and illustrated in the accompanying drawings.

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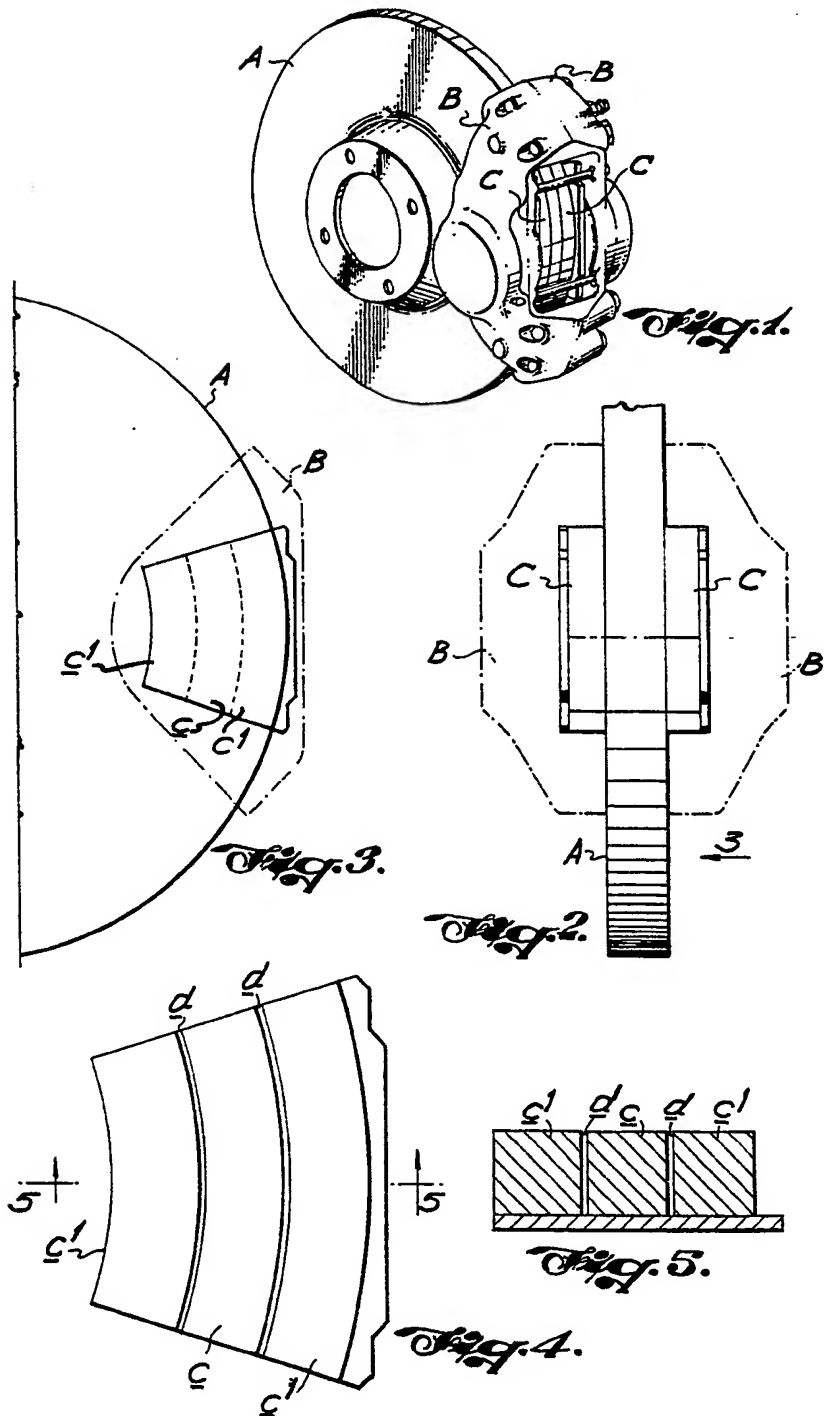
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1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.



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